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SAPC-21292

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14 November 1957

MEMORANDUM FOR : Project Director (R) 11/14/57

THROUGH : Project Director of Development and Procurement

SUBJECT : Future Camera Systems

REFERENCE : 1. Memo to Project Director from Chief, Photo Intelligence Division (TCS-2144-57)
2. Memo to Director of Development and Procurement from Project Director SAPC-20760.

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1. [] of Mr. Lundahl's shop were in DPO's office the morning of 13 November 1957 to discuss: 1. Types of photogrammetric data needed to establish various constants. 2. Need for convergent photography.

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2. [] and DPO will obtain and assist Art Lundahl's people to acquire information needed to establish greater photogrammetric data accuracy. For purposes of brevity only convergent photography will be discussed in detail.

3. The system desired by Mr. Lundahl and his people is one which will increase the stereo effect of an image. This is accomplished by increasing the base/altitude ratio (See attached sketch). Operationally this is accomplished by tilting the optical axis of the camera or cameras so it can photograph the same object from two widely separated points along line of flight. Convergent photography can be achieved by having two cameras installed one tilted to look forward and another to look backward. Another system can be designed which uses the same camera or cameras but is "panned" or moved in an angular direction parallel to line of flight. For example on approaching target, camera is pointed forward; upon passing target, it is pointed aft to again photograph the same object. This type of photography gives exaggerated stereo and consequently eases the task of vertical measurements.

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B. Neither [] who wrote the memo which Mr. Lundahl signed or [] had a camera system design in mind. They wish to retain the photo coverage we have at present time but they wish to also have longer focal lengths coupled with the convergence principle. Very briefly HTA wishes to have a reconnaissance capability with geodetic accuracy. This can be accomplished easily if there are no space or weight limitations. However, with these limitations the solution becomes more difficult.

4. Recommendation with respect to such a system.

A. DPO recommends Project Headquarters not consider incorporating a convergent camera system in current Project aircraft. Reasons for this decision are as follows:

1. Configuration "C" in Mode 1 (Burst) will ^{give} photo interpreters sufficient stereo effect to accomplish technical intelligence interpretation. In Mode 1, "C" camera looks ahead 6.7° and shoots again when target is abreast or below the camera. [] only objection to the "C" camera is its rather limited coverage in Mode 1.

2. Project could, with very little cost convert 24" cameras to a convergent system. However, because cameras would have to be reoriented within equipment bay, photo coverage would be reduced. Also tests have indicated that scales provided by 24" and 36" cameras make detail so small and so close to the recognition threshold that additional exaggeration of stereoscopic effect does not contribute further to photo interpretation.

5. For future planning, assuming higher altitudes will be sought, there is no doubt convergent photography should be programmed into the system. To be effective, focal length of a system such as this will have to be a minimum of 60".

6. If Project Director is interested in more detail, such as design of systems, advantages and disadvantages etc., DPO would be glad to discuss approaches and possible solutions to the problem.



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